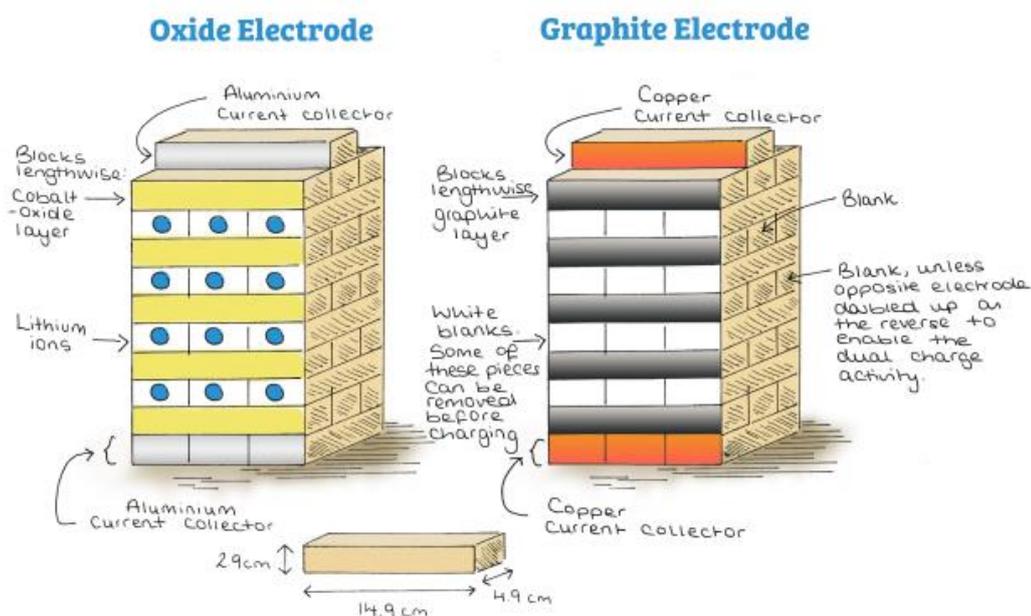


## Using Jenga to explain the operation of Li ion batteries

Members of the CATMAT team from the University of Birmingham have used tower block games such as Jenga to explain to schoolchildren how lithium-ion batteries work, meeting an educational need to better understand a power source that has become vital to everyday life.

By using the layers of blocks, children can get a sense of how the battery is constructed and how the different components interact with each other. The battery Jenga can show battery operation and key characteristics. The intercalation chemistry of charging and discharging this type of battery can be easily visualised. The simplicity of this demonstration provides a basis for complex chemistry and redox reactions to be explained. The importance and safety of rate of charge for differing applications can be shown too, when students remove the lithium ion blocks from the oxide electrodes at varying rates. The faster charge invariably leads to the Jenga structure collapsing. The tower block game can also demonstrate how the performance of the battery reduces over continued use by showing how the blocks become slightly displaced as the lithium blocks are removed and reinserted.



Elizabeth Driscoll, CATMAT PhD researcher, explains: "Hands-on demonstrations are known to be a useful way of supporting learning – teachers often use lemons or potatoes to explain conventional non-rechargeable batteries, for example. But we know that electrochemistry is a tricky area for teachers, which often leads to misconceptions among students. We wanted to design a hands-on activity that would help address this and explain this rechargeable-type."

By introducing tower block sets with strong contrasting colours and different textures, the team were also able to devise teaching tools that would be more inclusive for students who are blind or partially-sighted.

The activities have been trialled with multiple visiting schools over the past year, including: the Royal Society of Chemistry's Top of the Bench demonstration lecture, with positive feedback from both teachers and students. The sets have also made an appearance at public events at museums, from the ThinkTank museum in Birmingham to the Manchester Science Museum and the Royal Institution in London.

Educators interested in producing their own sets can access full instructions via the the open access paper in the Journal of Chemical Education

<https://pubs.acs.org/doi/10.1021/acs.jchemed.0c00282>

see also : <https://ceramics.org/ceramic-tech-today/education/unblock-your-learning-potential-jenga-teaches-students-how-lithium-ion-batteries-work>